

### **REMARKS**

In view of the above amendments and the following remarks, favorable reconsideration of the outstanding office action is respectfully requested.

Claims 16-19, 25-38, 40-43, 46 and 47 remain in this application. Applicants believe that no new matter is added to the application as part of this response.

#### **1. Amendments**

Claims 44 and 45 have been canceled.

Claim 16 has been rewritten to recite that the glass substrate is formed from a substantially germanium-free silica-based material. Support for this limitation is found in the specification as filed at page 10, line 24. Claim 16 has also been rewritten to recite that the glass substrate has not been subjected to a hydrogen loading step. Support for this limitation is found in the specification as filed at page 2, lines 7-22.

Claim 25 has been rewritten to recite that the interior of the glass body has a substantially germanium-free silica-based composition. Support for this limitation is found in the specification as filed at page 10, line 24. Claim 16 has also been rewritten to recite that the glass body has not been subjected to a hydrogen loading step. Support for this limitation is found in the specification as filed at page 2, lines 7-22.

Claims 40 and 41 have been amended to recite that the core of the waveguide has an interior non-surface corepath part that is at least 1 cm away from the exterior surfaces of the glass body. Support for this limitation is found in the specification as filed at page 4, line 10.

New claim 46 depends from claim 16, and recites that the substantially germanium-free silica-based material is an undoped silica material. Support for this limitation is found in the specification as filed at page 9, line 18.

New claim 47 depends from claim 25, and recites that the substantially germanium-free silica-based composition is an undoped silica composition. Support for this limitation is found in the specification as filed at page 9, line 18.

Please charge the fee of \$36 under 37 C.F.R. § 1.16(c) for two new claims in excess of twenty to Deposit Account 03-3325.

No new matter is believed to be added to the application by these amendments.

## **2. Claim Rejections – 35 U.S.C. § 112**

The Examiner has rejected claims 16-19, 25-38 and 40-45 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner has asserted that the term “H<sub>2</sub>-loaded” is indefinite as to its meaning.

Claim 16 has been rewritten to recite that the glass substrate has not been subjected to a hydrogen loading step. The term “hydrogen loading” would be understood by the skilled artisan as any process in which molecular hydrogen is diffused into a consolidated glass article in order to substantially increase the photosensitivity of the glass. Applicant notes that the term “hydrogen loading” has been used frequently in the patent literature (e.g. U.S. Patents 6,009,222; 5,881,186; and 5,500,031). The generic term “hydrogen loading” conventionally refers to processes using either molecular protium (hydrogen isotope with atomic mass of 1 atomic mass unit) or deuterium isotopes (see, e.g., U.S. Patents 5,500,031 and 5,287,427). Further, the term “hydrogen” is “the general name for the atom H, without regard for its nuclear mass...when it is not desired to distinguish between the isotopes.” (IUPAC Compendium of Chemical Technology, 2<sup>nd</sup> Edition (1997), available at <http://www.iupac.org/goldbook/H02898.pdf>). As used herein, hydrogen loading does not require any particular time/pressure/temperature condition. The Examiner’s suggested 10 day treatment (8/29 Office Action, page 3) would not read on the claims if sufficient hydrogen is diffused in the material to substantially increase the photosensitivity. A glass substrate having hydrogen incorporated from the use of SiH<sub>4</sub>/GeH<sub>4</sub> (8/29 Office Action, page 3) would read upon the “provided glass substrate” of claim 16, since it is not subjected to a “hydrogen loading” step as the skilled artisan would understand the term.

The beam is focused within the provided glass substrate. Since the provided glass substrate has not been subjected to a hydrogen loading step, the skilled artisan will understand that the focusing step is performed on a substrate which has not been

subjected to a hydrogen loading step. As such, Applicant submits that the skilled artisan will understand the claim to read upon methods in which a beam is focused in a glass substrate which has not been subjected to a hydrogen loading step.

Similarly to claim 16, claim 25 has been rewritten to recite that the glass substrate has not been subjected to a hydrogen loading step. As with claim 16, Applicant submits that the skilled artisan will understand the claim to read upon methods in which a beam is focused in a glass body which has not been subjected to a hydrogen loading step.

The Examiner asserts that the language "being clad in all directions perpendicular to the axis of the waveguide core" is indefinite. This language has been deleted from claim 25.

The Examiner has rejected claims 40 and 41 under 35 U.S.C. § 112, first paragraph, asserting that they fail to comply with the written description requirement. Claims 40 and 41 have been amended to recite that the core of the waveguide has an interior non-surface corepath part that is at least 1 cm away from the exterior surfaces of the glass body. Support for this limitation is found in the specification as filed at page 4, line 10.

#### **4. Claim Rejections – 35 U.S.C. § 102 - Cocito**

The Examiner has rejected claims 25, 34 and 37-38 under 35 U.S.C. § 102(e) as being anticipated by Cocito (U.S. Patent 6,209,356).

Claim 25 has been rewritten to recite that the interior of the glass body has a substantially germanium-free composition; the increased refractive index volume forms a waveguiding core within the homogeneous, germanium-free composition; and the waveguiding core is completely clad by the homogeneous, germanium-free composition.

Cocito is directed to the use of UV to write polarization-maintaining struts in optical fibers. Cocito teaches only the use of conventional germanium-containing optical fibers (see, col. 1, lines 44-52; and col. 2, lines 60-67). Because they are a fraction of the width of the optical fiber core, and have an index change on the order of  $10^{-4}$ , the struts are not optical waveguides themselves, but act merely as polarization maintaining

features in the conventionally-formed core of the optical waveguide. Further, these struts are surrounded on two sides by a composition different from that in which they are formed.

Since Cocito does not teach or suggest the formation of a waveguiding core within and completely clad by a homogeneous, substantially germanium-free composition, Applicant submits that it does not anticipate claim 25. Claims 34, 37 and 38 depend from claim 25, and are believed to be likewise patentable. Applicant therefore requests that the Examiner withdraw the rejections under 35 U.S.C. § 102(e) of claims 34, 37 and 38.

#### **5. Claim Rejections – 35 U.S.C. § 103(a) - Cocito**

The Examiner has rejected claims 26, 29-33 and 35-36 under 35 U.S.C. § 103(a) as being unpatentable over Cocito. Claims 26, 29-33 and 35-36 depend ultimately from claim 25, and are believed to be patentable for at least the reasons discussed above with respect to claim 25. As such, Applicant requests that the Examiner withdraw the rejections based on Cocito under 35 U.S.C. § 103(a) of claims 26, 29-33 and 35-36.

#### **6. Claim Rejections – 35 U.S.C. § 103(a) - Atkins**

The Examiner has rejected claims 16-19, 40-45, 25, 27-31, 35 and 36 under 35 U.S.C. § 103(a) as being unpatentable over Atkins (U.S. 5,287,427).

In Atkins, the glasses are subjected to hydrogen (either molecular protium or deuterium) loading steps at temperatures higher than room temperature, and partial pressures much higher than the normal atmospheric partial pressure of hydrogen. Claim 16 has been rewritten to recite that the glass substrate has not been subjected to a hydrogen loading step; according to the conventional meaning of “hydrogen loading” (described in part 2 of this response), this claim limitation includes both loading with molecular protium or deuterium. The absence of a hydrogen loading step is neither taught nor suggested in Atkins; rather, Atkins requires hydrogen loading with either molecular protium or deuterium.

Further, claim 16 requires that the cladding surrounding the waveguide core be formed from the substantially germanium-free silica based material that is used to form the waveguide core. In Atkins, the top and bottom cladding of the planar waveguide is formed from different materials formed as different layers in the planar device.

As such, Applicant suggests that the process of claim 16 is not rendered unpatentable by Atkins. Claims 17-19 depend from claim 16, and are likewise believed to be patentable over Atkins. Applicant therefore requests that the Examiner withdraw the rejections based on Atkins under 35 U.S.C. § 103(a) of claims 16-19.

Claim 25 has been rewritten to recite that the glass body has not been subjected to a hydrogen loading step, and that the waveguide core is completely clad by the homogeneous, germanium-free composition. For the reasons described above with reference to claim 16, Applicant submits that claim 25 is not rendered obvious by Atkins. Claims 27-31, 35 and 36 depend ultimately from claim 25, and are likewise believed to be patentable over Atkins. Applicant therefore requests that the Examiner withdraw the rejections based on Atkins under 35 U.S.C. § 103(a) of claims 25, 27-31, 35 and 36.

Claims 40-43 depend ultimately from either claim 16 or claim 25, and are believed to be patentable for at least the reasons discussed above. Applicant therefore requests that the Examiner withdraw the rejections based on Atkins under 35 U.S.C. § 103(a) of claims 40-43.

Claims 44 and 45 have been canceled, rendering moot the rejections thereof.

## **7. Conclusion**

Based upon the above amendments, remarks, and papers of record, Applicant believes the pending claims of the above-captioned application are in allowable form and patentable over the cited references. Applicant respectfully requests reconsideration of the pending claims and prompt further action thereon.

Applicant believes that no extension of time is necessary to make this Response timely. Should Applicant be in error, Applicant respectfully requests that the Office

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Reply to Office Action of: 8/29/03

grant such time extension pursuant to 37 C.F.R. §1.136(a) as necessary to make this Reply timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to James V. Suggs at 607/974-3606.

Date: 12-1-03

Respectfully submitted,

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